UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,714	11/24/2003	Lawrence S. Baum	038190/270317	5406

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EXAMINER
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ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/720,714	BAUM ET AL.
	Examiner	**Art Unit**	
	Dwin M. Craig	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>24 November 2003</u>.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-55</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-55</u> is/are rejected.

7) ☒ Claim(s) <u>2, 9, 21, 26 and 43</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>24 November 2003</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>4/30/2004</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

1.   Claims 1-55 have been presented for examination.

Claim Objections

2.   Antecedent ambiguity, dependent claims 2 and 21 are objected to because it is unclear

from the current claim language how the claimed "the diagram" has been generated from the

previous claim language or how this phrase is drawing antecedent support from the previously

claimed limitations. See also 37 CFR 1.75 paragraph 1.

2.1   Antecedent ambiguity, dependent claims 9, 26 and 43 are objected, using dependent

claim 9 as an example, in lines 2 & 3 of the current claim is disclosed; "at least <u>one</u> figure-sheet

set specification" however on line 6 of the same claim is the following; "of the at least figure

sheet set specification", this claim language is inconsistent and requires amendment to remove

any ambiguity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.

4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3.   Claims 1-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Graphics Recognition for a Large-Scale Airplane Information System" hereafter referred to as *Baum et al.* in view of "Interpretation of Technical Illustrations for Airplane Maintenance and Operations Applications, hereafter referred to as *Boose et al.*

3.1   Regarding independent claims 1, 20 and 38 and using independent claim 1 as an example, *Baum et al.* teaches, *a method for automatically generating a subset of components from a plurality of components comprising: receiving a request to generate a subset of components;* Page(s) 292 and 293 teach;

"For example, suppose that there is a problem in the air conditioning system in the crew rest area of a 757. The mechanic uses the system to go directly from the fault code for that problem to the fault isolation procedure in the Fault Isolation Manual, via a text hyperlink. The procedure references a four-sheet figure containing a fault isolation decision tree. <u>By clicking on hotspots in the graphic, he quickly gets to the corrective action, which is a removal and</u>

installation procedure in the Airplane Maintenance Manual. There is a hotspot on that reference,

so he quickly navigates to the correct location in the Maintenance Manual. The procedure

requires inspection of a wiring diagram, found in the Wiring Diagram Manual. There is a

hyperlink in the Maintenance Manual which takes the mechanic to the correct diagram. Because

the graphic viewer traces electrical circuits in the diagram, the mechanic can readily determine

the affected components and the associated pin numbers so that removal/installation is done

properly. The desired component is not in stock, however, so the mechanic needs to consult the

Illustrated Parts Catalog. The component number in the wiring diagram also has a hotspot, so he

can go directly from the Wiring Diagram Manual to the desired location in the Illustrated Parts

Catalog. The illustrations there are also populated with hotspots so that the mechanic can easily

pull up the information as to part number and supplier, so that the part can be obtained as quickly

as possible."

Further and in regards to the claimed limitation; *generating a subset of components from*

*a plurality of components*; the illustration on page 297, Figure 3:
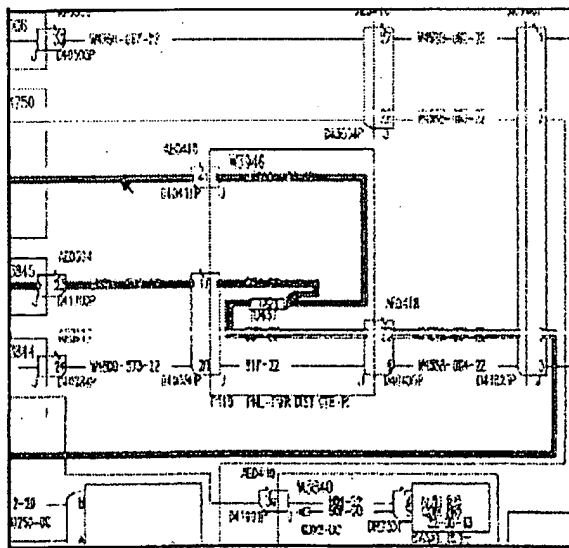
Clearly from the diagram, a copy of which is presented here, a subset of the components is being high lighted and therefore, the generation of a subset of components is being presented.

accessing connectivity data comprising information regarding at least the plurality of components and connections among the plurality of components; (See page 297 the first paragraph, which is repeated here…);

"Component location diagrams provide exploded views of aircraft and their components. Typically one diagram consists of multiple sheets, each of which has one or more subpictures (insets) with internal callout references. Our software must reliably subdivide each image into subpictures and generate the hot spots that link the callouts to the correct subpicture, including references to other sheets. In addition, the software generates hot spots around each equipment number, so that mechanics can easily navigate from the picture to information about that piece of equipment. This manual set contains over 650 vector component location diagrams; the system produced over 3200 subpictures containing over 25,000 hot spots (Figure 2)."

However, *Baum et al.* does not expressly disclose, *and automatically selecting portions of the connectivity data that satisfy the request to generate the subset of components.*

Boose et al. teaches in Figure 3;
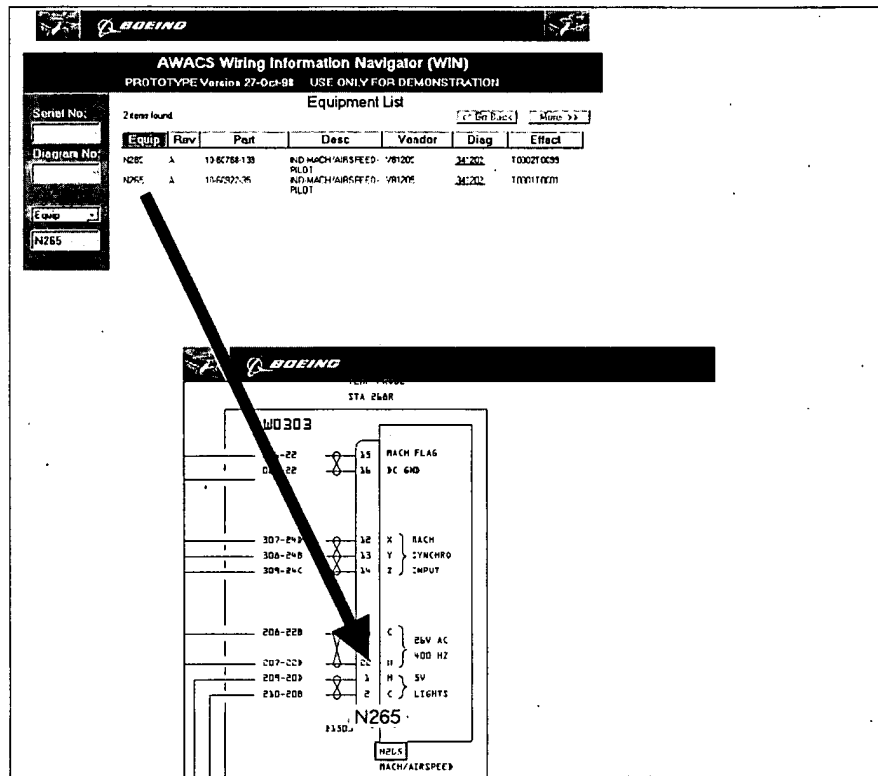
Along with the descriptive text provided in *Boose et al.* the provided example teaches

clearly provide a to providing of connection information between the subset of components.

Baum et al. and *Boose et al.* are analogous art because they both come from the same

problem solving area of navigation of complex component data in a context sensitive manner.

At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to have provided connection information between subcomponents of a subgroup.

The motivation for doing so would have been to provide maintenance Aids to older

aircraft and provide for a system and a method to facilitate more efficient repair and maintenance

of aircraft, see page the last page of *Boose et al.* a portion of which is repeated here;

"Our wiring diagram methodology works for vector diagrams, but there are hundreds of thousands of legacy illustrations in raster. If we had reliable raster-to-vector conversion software, we could convert those diagrams to intelligent wiring diagrams as well, enabling Boeing to provide maintenance aids for older aircraft as well. Such raster-to-vector conversion software must reliably find lines, circles, and circular arcs, and correctly perform optical character recognition on all the text in the diagram. The input would be very clean raster images with machine-printed characters."

It is further noted that the *Baum et al.* reference is listed in the *Boose et al.* reference.

Therefore, it would have been obvious to combine *Boose et al.* with *Baum et al.* to obtain the invention as specified in claims 1-55.

3.2   As regards dependent claims 2, 21, 47 and 55 and using dependent claim 2 as an example, *Baum et al.* teaches, *further comprising displaying the diagram of the subset of components* (Figure 4 on page 298).

3.3   As regards dependent claim 3, *Baum et al.* does not expressly teach, *wherein receiving a request comprises receiving a unique name of at least one component desired in the subset of components* however, *Boose et al.* teaches (Figure 1 "CLUTCH SAFETY SWITCHES", "TORQUE MODULATION SWITCH NO 1").

3.4   As regards dependent claim 4, *Baum et al.* does not expressly teach, *wherein receiving a request comprises receiving a description of at least one component desired in the subset of components* however, *Boose et al.* teaches (Figure 1 which discloses descriptions, see also the descriptive text).

3.5   As regards dependent claims 5, 22 and 39 and using dependent claim 5 as an example,

Baum et al. teaches, *wherein receiving a request comprises receiving a request for the subset of components that connect at least two other components, and wherein automatically selecting portions of the connectivity data comprises selecting portions of the connectivity data that create at least one path between the at least two other components* (the illustration on page 297, Figure 3).

3.6 As regards dependent claims 6, 23, 24, 40 and 41 and using dependent claim 5 as an example, *Baum et al.* teaches, *wherein receiving a request comprises receiving a request for the subset of components that connect a source component to a sink component, and wherein automatically selecting portions of the connectivity data comprises selecting portions of the connectivity data that create at least one path between the source component and the sink component* (the illustration on page 297, Figure 3 the electrical components have a starting point "source" and an ending point "sink").

3.7 As regards dependent claim 7, *Baum et al.* teaches; *wherein receiving a request comprises receiving a request for the subset of components that connect a respective component to at least one of a source component and a sink component, and wherein automatically selecting portions of the connectivity data comprises selecting portions of the connectivity data that create at least one path between the respective component and at least one of the source component and the sink component* (the illustration on page 297, Figure 3 the high-lighted path is the *one path*).

3.8 As regards dependent claims 8, 25 and 42 and using dependent claim 8 as an example, *Baum et al.* teaches; *wherein receiving a request comprises receiving a request for the subset of components that comprises at least one of an Airline Transport Association (ATA) system and a Unified Numbering System (UNS), and wherein automatically selecting portions of the*

*connectivity data comprises selecting portions of the connectivity data that include the
components of the at least one of the ATA system and the UNS and that create at least one path
among the components of the at least one of the ATA system and the UNS,* (page 291 and page
301).

3.9 As regards dependent claims 9, 26 and 43 and using dependent claim 9 as an example,
Baum et al. teaches, *wherein receiving a request comprises receiving a request for the subset of
components that comprises at least one figure-sheet set specification, and wherein automatically
selecting portions of the connectivity data comprises selecting portions of the connectivity data
that include the components of the at least one figure sheet set specification and that create at
least one path among the components of the at least figure sheet set specification* (page 297 the
first paragraph, which is repeated here...);

"Component location diagrams provide exploded views of aircraft and their components.
Typically one diagram consists of multiple sheets, each of which has one or more subpictures
(insets) with internal callout references. Our software must reliably subdivide each image into
subpictures and generate the hot spots that link the callouts to the correct subpicture, including
references to other sheets. In addition, the software generates hot spots around each equipment
number, so that mechanics can easily navigate from the picture to information about that piece of
equipment. This manual set contains over 650 vector component location diagrams; the system
produced over 3200 subpictures containing over 25,000 hot spots (Figure 2)."

3.10 As regards dependent claims 10, 27, 44 and 50 *Baum et al.* does not expressly disclose,
*removing at least one component from the automatically selected portions of the connectivity
data that satisfy the request for the subset of components; and directly connecting the*

components that attach to a removed component prior to generating the diagram of the subset of

components.

However, in view of the methodologies disclosed in the combined teachings, it would

have been obvious to an artisan of ordinary skill, at the time of the invention, to *update* the

schematic wiring drawings when, during the course of maintenance and repair, a part had been

removed.

3.11   As regards dependent claims 11, 28 and 45, *Baum et al.* does not expressly disclose,

wherein receiving a request comprises receiving a request for the subset of components that

comprises at least one of a maximum number of components and a maximum number of

connections, and wherein automatically selecting portions of the connectivity data comprises

selecting portions of the connectivity data that satisfy the at least one requested maximum

number of components and maximum number of connections.

However in view of the methodologies disclosed in the combined teachings, it would

have been obvious to an artisan of ordinary skill, at the time of the invention, to provide for

boundary conditions in the search for components, because if a search was failing the system

need a mechanism to halt an endless search that will never produce a termination condition.

3.12   Regarding dependent claims 12, 29 and 46, *Baum et al.* teaches; *wherein receiving a*

request comprises receiving a request for the subset of components that comprise a path that is

located a predefined distance away from a respective component, and wherein automatically

selecting portions of the connectivity data comprises selecting portions of the connectivity data

that include the path that is located the predefined distance away from the respective component

(Figure 5 on page 298 shows distance between the components).

3.13   Regarding dependent claims 13, 30 and 31 and using claim 13 as an example, *Baum et al.*

teaches, *further comprising generating a diagram of the subset of components from the portions*

of the connectivity data that satisfy the request for the subset of components (Figure 4 on page

297).

3.14   Regarding claims 14, 32 and 49, *Baum et al.* teaches, *comprising adding at least one*

component to the subset of components after generating the diagram of the subset of components

and re-generating a diagram of the subset of components including the at least one added

component. Page 297, second paragraph;

"Component index tables are vector drawings that tell the mechanic where to go to find

the maintenance procedures for the equipment illustrated in the component location drawings.

The index table recognizer determines the individual table cells and relationships among cell

contents. It <u>generates</u> over 14,000 hot spots in over 300 tables linking the drawings to component

location diagrams, other component index tables and to maintenance procedures."

3.15   Regarding dependent claims 15 and 33 and using claim 15 as an example, *Baum et al.*

teaches, *removing at least one component from the subset of components after generating the*

diagram of the subset of components and re-generating a diagram of the subset of components

without the at least one removed component.

Page 297, second paragraph;

"Component index tables are vector drawings that tell the mechanic where to go to find

the maintenance procedures for the equipment illustrated in the component location drawings.

The index table recognizer determines the individual table cells and relationships among cell

contents. It generates over 14,000 hot spots in over 300 tables linking the drawings to component

location diagrams, other component index tables and to maintenance procedures."

If a component is changed the software would *re-generate* the drawings as required.

3.16   Regarding dependent claims 16, 34 and 51, and using claim 16 as an example, *Baum et*

al. does not expressly disclose, *wherein receiving a request comprises receiving a request for the*

subset of components included in a repair log, and wherein automatically selecting portions of

the connectivity data comprises selecting portions of the connectivity data that include the

components included in the repair log.

However, *Boose et al.* suggests that repair logs data would be required for maintenance of

older aircraft, see the first page, portions of which are presented here;

"Modern commercial and military aircraft require extensive maintenance and operations

documentation. Traditionally, this has been in the form of multiple paper (or microfiche)

manuals encompassing millions of pages including hundreds of thousands of technical

illustrations. Much of the critical information that the technician needs to perform his or her task

is exclusively located in the illustrations, so that the majority of time spent with the manuals is

devoted to accessing and studying illustrations."

3.17   Regarding dependent claims 17, 35 and 52, and using claim 17 as an example, *Baum et*

al. does not expressly disclose, *wherein automatically selecting portions of the connectivity data*

further comprises selecting portions of the connectivity data that create at least one path among

the components included in the repair log.

However, *Boose et al.* suggests that repair logs data would be required for maintenance of

older aircraft, see the first page, portions of which are presented here;

"Modern commercial and military aircraft require extensive maintenance and operations documentation. Traditionally, this has been in the form of multiple paper (or microfiche) manuals encompassing millions of pages including hundreds of thousands of technical illustrations. Much of the critical information that the technician needs to perform his or her task is exclusively located in the illustrations, so that the majority of time spent with the manuals is devoted to accessing and studying illustrations."

3.18   Regarding dependent claims 18, 36 and 53, and using dependent claim 18 as an example, *Baum et al.* does not expressly disclose, *wherein receiving a request comprises receiving a request for the subset of components included in a maintenance procedure, and wherein automatically selecting portions of the connectivity data comprises selecting portions of the connectivity data that include the components included in the maintenance procedure.*

However, *Boose et al.* suggests that repair logs data would be required for maintenance of older aircraft, see the first page, portions of which are presented here;

"Modern commercial and military aircraft require extensive maintenance and operations documentation. Traditionally, this has been in the form of multiple paper (or microfiche) manuals encompassing millions of pages including hundreds of thousands of technical illustrations. Much of the critical information that the technician needs to perform his or her task is exclusively located in the illustrations, so that the majority of time spent with the manuals is devoted to accessing and studying illustrations."

3.19   Regarding dependent claims 19, 37 and 54, and using claim 19 as an example, *Baum et al.* does not expressly disclose, *wherein automatically selecting portions of the connectivity data*

further comprises selecting portions of the connectivity data that create at least one path among

the components included in the maintenance procedure.

However, *Boose et al.* suggests that repair logs data would be required for maintenance of

older aircraft, see the first page, portions of which are presented here;

"Modern commercial and military <u>aircraft require extensive maintenance and operations</u>

<u>documentation.</u> Traditionally, this has been in the form of multiple paper (or microfiche)

manuals encompassing millions of pages including hundreds of thousands of technical

illustrations. Much of the critical information that the technician needs to perform his or her task

is exclusively located in the illustrations, so that the majority of time spent with the manuals is

devoted to accessing and studying illustrations."

As well as figures 1 and 3 and the descriptive text.

3.20   Regarding dependent claim 48, *Baum et al.* teaches software, see figure 10 and *Boose et*

al. teaches the use of software see the last page of *Boose et al.* a portion of which is repeated

here;

"Our wiring diagram methodology works for vector diagrams, but there are hundreds of

thousands of legacy illustrations in raster. If we had reliable raster-to-vector conversion <u>software,</u>

we could convert those diagrams to intelligent wiring diagrams as well, enabling Boeing to

provide maintenance aids for older aircraft as well. Such raster-to-vector conversion software

must reliably find lines, circles, and circular arcs, and correctly perform optical character

recognition on all the text in the diagram. The input would be very clean raster images with

machine-printed characters."

It would have been obvious to an artisan of ordinary skill, at the time the invention was made, to have the software be *modular* and have one executable portion, *or module* encompass another executable portion.
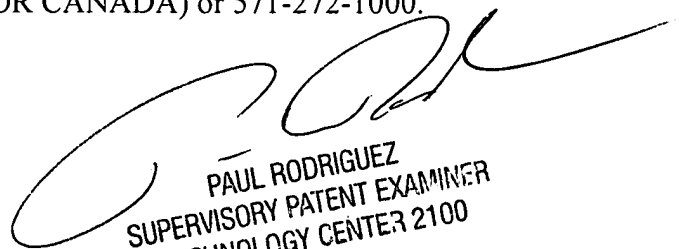
Conclusion

4.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwin M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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